

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A machine implemented method of compressing speech data, comprising:
  - parsing an input waveform into pitch segments;
  - determining principal components of at least one pitch segment;
  - sending to a receiver a subset of the determined principal components during an initial transmission period; and
  - sending to the receiver coefficients of the input waveform for each pitch segment during a period subsequent to the initial transmission period, the coefficients being determined from the input waveform.
2. (Original) The method of claim 1 wherein sending a subset of the principal components comprises sending six principal components.
3. (Currently Amended) The method of claim 1 wherein determining comprises:
  - determining the number of pitch periods; and
  - generating a correlation matrix corresponding to the number of pitch periods.
4. (Original) The method of claim 1 wherein determining comprises:
  - ordering the principal components.
5. (Original) The method of claim 1, further comprising:
  - determining coefficients for each pitch period.

6. (Original) The method of claim 1, further comprising:  
determining if the principal components are still valid.

7. (Original) The method of claim 6 wherein determining if the principal components are still valid comprises:  
determining if a pitch segment exceeds a predetermined threshold.

8. (Original) The method of claim 7 wherein the predetermined threshold is a measure of a distance from a pitch segment to a centroid determined by the principal components.

9. (Original) The method of claim 7, further comprising:  
selecting a new set of principal components when the predetermined threshold is exceeded.

10. (Original) The method of claim 1, further comprising:  
reconstructing the input waveform.

11. (Original) The method of claim 10 wherein reconstructing comprises:  
scaling the principal components by the coefficients for each pitch segment to form scaled components; and  
summing the scaled components.

12. (Original) The method of claim 10, wherein reconstructing further comprises:  
concatenating reconstructed components of the input waveform; and  
using a smoothing filter while concatenating the reconstructed components.

13. (Currently Amended) The method of claim ~~[[10]]~~ 12 wherein the smoothing filter is an alpha blend filter.

14. (Original) The method of claim 1, further comprising:  
reducing the principal components to reduce the number of bits transmitted.

15. (Original) The method of claim 1, further comprising:  
improving the accuracy of reconstructing the input wave form by increasing the number of principal components.

16. (Currently Amended) A method of receiving an input waveform, comprising:  
receiving a subset of determined principal components of at least one pitch segment during an initial transmission period; ~~[[and]]~~  
receiving coefficients of the input waveform for each pitch segment during a period subsequent to the initial transmission period; and  
reconstructing the input waveform using one or more of the principal components and coefficients.

17. (Original) The method of claim 16 wherein reconstructing comprises:  
scaling the principal components by the coefficients for each pitch segment to form scaled components; and  
summing the scaled components.

18. (Original) The method of claim 16, wherein reconstructing further comprises:  
concatenating reconstructed components of the input waveform; and  
using a smoothing filter while concatenating the reconstructed components.

19. (Original) The method of claim 18 wherein the smoothing filter is an alpha blend filter.

20. (Currently Amended) A method of compressing speech data, comprising:  
parsing an input waveform into pitch segments;  
determining principal components of at least one pitch segment;  
sending to a receiver a subset of the determined principal components during an initial transmission period;  
sending to the receiver coefficients of the input waveform for each pitch segment during a period subsequent to the initial transmission period;  
receiving at a the receiver a subset of determined principal components of at least one pitch segment during an initial transmission period; and  
receiving at the receiver coefficients of the input waveform for each pitch segment during a period subsequent to the initial transmission period, the coefficients being determined from the input waveform.

21. (Currently Amended) An apparatus comprising:  
a memory that stores executable instructions for compressing speech data; and  
a processor that executes the instructions to:  
parse an input waveform into pitch segments;  
determine principal components of at least one pitch segment;  
send to a receiver a subset of the determined principal components during an initial transmission period; and  
send to the receiver coefficients of the input waveform for each pitch segment during a period subsequent to the initial transmission period, the processor generating the coefficients.

22. (Original) The apparatus of claim 21 wherein to send a subset of the principal components comprises sending six principal components.

23. (Currently Amended) The apparatus of claim 21 wherein to determine comprises:  
determining the number of pitch periods; and  
generating a correlation matrix corresponding to the number of pitch periods.

24. (Original) The apparatus of claim 21 wherein to determine comprises:  
ordering the principal components.

25. (Original) The apparatus of claim 21, further comprising instructions to:  
determine coefficients for each pitch period.

26. (Original) The apparatus of claim 21, further comprising instructions to:  
determine if the principal components are still valid.

27. (Original) The apparatus of claim 26 wherein the instructions to determine if the  
principal components are still valid comprises:  
determining if a pitch segment exceeds a predetermined threshold.

28. (Original) The apparatus of claim 27 wherein the predetermined threshold is a  
measure of a distance from a pitch segment to a centroid determined by the principal  
components.

29. (Original) The apparatus of claim 27, further comprising instructions to:  
select a new set of principal components when the predetermined threshold is exceeded.

30. (Original) The apparatus of claim 21, further comprising instructions to:  
reconstruct the input waveform.

31. (Original) The apparatus of claim 30 wherein instructions to reconstruct comprises:  
scaling the principal components by the coefficients for each pitch segment to form  
scaled components; and  
summing the scaled components.

32. (Original) The apparatus of claim 30, wherein instructions to reconstruct comprises:  
concatenating reconstructed components of the input waveform; and  
using a smoothing filter while concatenating the reconstructed components.

33. (Currently Amended) An apparatus comprising:  
a memory that stores executable instructions for receiving an input waveform; and  
a processor that executes the instructions to:  
receive at a receiver a subset of determined principal components of at least one pitch  
segment during an initial transmission period; and  
receive at the receiver coefficients of the input waveform for each pitch segment during a  
period subsequent to the initial transmission period, the processor generating the coefficients.

34. (Original) The apparatus of claim 33, wherein instructions to reconstruct comprises:  
scaling the principal components by the coefficients for each pitch segment to form  
scaled components; and  
summing the scaled components.

35. (Original) The apparatus of claim 33, wherein instructions to reconstruct comprises:  
concatenating reconstructed components of the input waveform; and  
using a smoothing filter while concatenating the reconstructed components.

36. (Currently Amended) An apparatus comprising:  
a memory that stores executable instructions for compressing speech data; and

a processor that executes the instructions to:

- parse an input waveform into pitch segments;
- determine principal components of at least one pitch segment;
- send to a receiver a subset of the determined principal components during an initial transmission period;
- send to the receiver coefficients of the input waveform for each pitch segment during a period subsequent to the initial transmission period, the processor generating the coefficients;
- receive at the receiver a subset of determined principal components of at least one pitch segment during an initial transmission period; and
- receive at the receiver coefficients of the input waveform for each pitch segment during a period subsequent to the initial transmission period.

37. (Currently Amended) An article comprising a machine-readable medium that stores executable instructions for compressing speech data, the instructions causing a machine to:

- parse an input waveform into pitch segments;
- determine principal components of at least one pitch segment;
- send to a receiver a subset of the determined principal components during an initial transmission period; and
- send to the receiver coefficients of the input waveform for each pitch segment during a period subsequent to the initial transmission period, the machine generating the coefficients.

38. (Original) The article of claim 37 wherein instructions causing a machine to send a subset of the principal components comprise instructions causing a machine to send six principal components.

39. (Currently Amended) The article of claim 37 wherein instructions causing a machine to determine comprise instructions causing a machine to:

- determine the number of pitch periods; and

generating a correlation matrix corresponding to the number of pitch periods.

40. (Original) The article of claim 37 wherein instructions causing a machine to determine comprise instructions causing a machine to:  
order the principal components.

41. (Original) The article of claim 37, further comprising instructions causing a machine to:  
determine coefficients for each pitch period.

42. (Original) The article of claim 37, further comprising instructions causing a machine to:  
determine if the principal components are still valid.

43. (Original) The article of claim 42 wherein instructions causing a machine to determine if the principal components are still valid comprise instructions causing a machine to:  
determine if a pitch segment exceeds a predetermined threshold.

44. (Original) The article of claim 43 wherein the predetermined threshold is a measure of a distance from a pitch segment to a centroid determined by the principal components.

45. (Original) The article of claim 43, further comprising instructions causing a machine to:  
select a new set of principal components when the predetermined threshold is exceeded.

46. (Original) The article of claim 37, further comprising instructions causing a machine to:  
reconstructing the input waveform.



47. (Original) The article of claim 46 wherein instructions causing a machine to reconstruct comprise instructions causing a machine to:

- scale the principal components by the coefficients for each pitch segment to form scaled components; and
- sum the scaled components.

48. (Original) The article of claim 46, wherein instructions causing a machine to reconstruct further comprise instructions causing a machine to:

- concatenate reconstructed components of the input waveform; and
- use a smoothing filter while concatenating the reconstructed components.

49. (Currently Amended) An article comprising a machine-readable medium that stores executable instructions for receiving an input waveform, the instructions causing a machine to:

- receive at a receiver a subset of determined principal components of at least one pitch segment during an initial transmission period; and
- receive at the receiver coefficients of the input waveform for each pitch segment during a period subsequent to the initial transmission period, the coefficients generated at a different machine.

50. (Original) The article of claim 49, wherein instructions causing a machine to reconstruct comprise instructions causing a machine to:

- scaling the principal components by the coefficients for each pitch segment to form scaled components; and
- summing the scaled components.

51. (Original) The article of claim 49, wherein instructions causing a machine to reconstruct comprise instructions causing a machine to:

concatenate reconstructed components of the input waveform; and  
use a smoothing filter while concatenating the reconstructed components.

52. (Currently Amended) An article comprising a machine-readable medium that stores executable instructions for compressing speech data, the instructions causing a machine to:

parse an input waveform into pitch segments;

determine principal components of at least one pitch segment;

send to a receiver a subset of the determined principal components during an initial transmission period;

send to the receiver coefficients of the input waveform for each pitch segment during a period subsequent to the initial transmission period, the machine generating the coefficients;

receive at the receiver a subset of determined principal components of at least one pitch segment during an initial transmission period; and

receive at the receiver coefficients of the input waveform for each pitch segment during a period subsequent to the initial transmission period.

53. (Original) The method of claim 1, further comprising:

comparing principal components to a library of principal components previously spoken by a speaker.

54. (Original) The method of claim 53, further comprising:

generating phonemes; and

converting the phonemes to text.

55. (Original) The method of claim 1, further comprising:

receiving a phoneme; and

combining the coefficients and the principal components with the phoneme to produce natural speech.

56. (Original) The method of claim 55, further comprising;  
altering the coefficients to reflect user selectable intonations.

57. (Original) The method of claim 16, further comprising:  
comparing principal components to a library of principal components previously spoken  
by a speaker.

58. (Original) The method of claim 57, further comprising:  
generating phonemes; and  
converting the phonemes to text.

59. (Original) The method of claim 16, further comprising:  
receiving a phoneme; and  
combining the coefficients and the principal components with the phoneme to produce  
natural speech.

60. (Original) The method of claim 59, further comprising;  
altering the coefficients to reflect user selectable intonations.